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ABSTRACT

A study explored the application of reflective judgment theory to the types of problem solving faced by students in community service placements. It also tested the impact of different service-learning experiences on growth in reflective judgment over the course of a semester. Participants were 66 students in 6 colleges and universities. They were interviewed at the beginning and end of their service-learning semester using a problem-solving protocol based on issues with which they were dealing in their service. Although service alone did not appear to contribute to development of more complex reflective judgment, students who were in well-integrated and highly reflective service-learning classes were significantly more likely to demonstrate growth than those in moderate or low intensity service-learning experiences. (Appendixes contain 18 references, 2 tables, and 3 figures.) (Author/YLB)

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Service-Learning and the Development of Reflective Judgment

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Service-Learning and the Development of Reflective Judgment

Abstract: In this study, we explore the application of reflective judgment theory to the types of problem solving faced by students in community service placements and test the impact of different service-learning experiences on growth in reflective judgment over the course of a semester. Participants were 66 students in 6 colleges and universities; they were interviewed at the beginning and end of their service-learning semester using a problem solving protocol based on issues they were dealing with in their service. While service alone did not appear to contribute to development of more complex reflective judgment, students who were in well integrated and highly reflective service-learning classes were significantly more likely to demonstrate growth than those in moderate or low intensity service-learning experiences.

Cognitive Outcomes of Service-Learning

"Service, combined with learning, adds value to each and transforms both" (Honnet and Poulsen, 1989) This quote captures the core of widely held practitioner belief about what is unique in service-learning programs which combine classroom learning with service work in the community. Learning improves the quality of service today and more importantly helps sustain it throughout a citizen's life; service transforms learning, changing inert knowledge to knowledge and competencies that students can use in their communities. And this practitioner wisdom about effective learning is consistent with a long tradition of experiential learning theory from Dewey to modern cognitive scientists.

This belief that service leads to better learning has led to a virtual explosion of service-learning programs (O'Brien, 1993) While the political support for such programs has grown, there is very little empirical research to go along with the social and theoretical justifications for service-learning. The need to anchor programs in empirical evidence has led to a growing demand for research information about the effects of service-learning on cognitive outcomes. Most of the research has focused on the effects of service on attitudes and values, and there is good evidence to support the effectiveness of service-learning on students' personal development and social responsibility. There has been less evidence of intellectual impact. (Eyler and Giles, 1997) While

there is some limited evidence that service can increase conventional classroom knowledge acquisition (Markus, Howard and King, 1993), most studies have not shown an impact on increased factual knowledge. Indeed, one of the important research questions for the field is the identification of cognitive outcomes that are unique to or particularly enhanced by service-learning. (Giles and Eyler, forthcoming)

It may be in the domain of complex problem solving rather than simple fact acquisition that service-learning makes its greatest contributions. The ability to think critically about complicated community problems is central to effective citizenship and also arguably more likely to develop when students address these issues in context. Service-learning is a perfect example of what Dewey describes as an educative experience i.e. it involves activities which are interesting and awaken curiosity in students, which involve experience allows development over time and which are intrinsically important. (Dewey, 1933) When students as part of their coursework perform community service, they have the opportunity to address authentic problems in the field and bring critical analysis to bear; service-learning encourages students to generate and answer real questions and helps them develop a nuanced understanding of issues in situational context. There is some evidence that service-learning contributes to a more complex understanding of social problems. (Conrad and Hedin, 1980: Eyler and Halteman, 1981; Batchelder and Root, 1993; Giles and Eyler, 1994)

One measure of cognitive development with strong implications for understanding of community issues is what King and Kitchener (1994)have termed 'reflective judgment', a form of post formal reasoning. Embedded in the reflective judgment model of adult cognitive development is a series of increasingly complex cognitive skills that are integral to successful professional problem solving and a closely related series of increasingly complex assumptions about the nature of knowledge and justification. (King and Kitchener, 1994) More than two decades of longitudinal and cross-sectional research have indicated that with time and an appropriate learning environment adolescents and adults develop skills for identifying, framing, resolving and

re-addressing unstructured problems. Those with higher levels of reflective judgment are better able to assess the complexity of issues and to find, use and evaluate information more effectively than those with less well developed understanding of how to deal with conflicting sources of knowledge. Development of more complex reflective judgment is associated with the learning processes i.e. analysis of complex issues within realistic contexts, that are central to service-learning. It is particularly appropriate as a process for measuring the impact of service-learning because its focus is on ill-structured problems like those faced by citizens in their communities.

This study is designed to test the proposition that service-learning classes which are highly reflective and continuously challenge students to analyze social problems in the context of their experience will promote higher levels of critical thinking ability. Because reflective judgment theory is an attempt to understand increasingly adequate ways to deal with complex ill-structured problems, we have chosen to measure critical thinking ability using this methodology. This study addresses the following questions:

1. Will previous service, previous service-learning, age or gender affect the pre-test level of reflective judgment?
2. Will students who participate in service-learning show significant growth in reflective judgment compared to those students who do not participate over the course of a semester?
3. Will students who participate in high intensity service-learning classes where reflection on the service is central to the day to day activities of the class show growth in reflective judgment compared to students whose service is less central to the daily activities of the class?

Reflective Judgment, Service-Learning and Ill-structured Problem Solving

Reflective judgment addresses the critical thinking skills needed by people coping with ill-structured problems. Well structured problems have clear goals and known constraints and their solution paths are well established; many dilemmas faced by technical experts have these characteristics. In contrast, the problems encountered by students in service-learning are similar to the problems encountered by social scientists. They usually involve a problematic situation, such as poverty, homelessness or continuing spread of HIV in the population and their solution often lies in eliminating causes of the problem. Typically there is no consensus about the best solution to these complex social problems. They must be addressed under conditions of uncertainty regarding sources of adequate data, interpretation of that data, alternative solutions, constraints on possible solutions and the impact of various options. The ultimate goal is to make decisions in the face of complexity and uncertainty. Because information essential to solving the problem, such as causes or constraints is often unknown, the problem solver must often supply them from his or her own knowledge or experience or have complex strategies for acquiring new information. Feedback about the efficacy of solutions is often not immediate and there is often no clear criteria for evaluating successful solutions to the problem. (Voss, Tyler and Yengo, 1983)

Voss and his colleagues who have conducted research to explore differences in social science problem solving of experts and novices have found that experts tend to focus more heavily on the defining and framing of the problems, where novices tend to leap to a solution. Experts explore the knowledge of the domain to construct a problem representation. Experts also tend to generate solutions in which a large number of their statements are devoted to justifications for the solutions and consideration of alternatives. (Voss et al, 1983) This is parallel to the process of problem solving identified in the reflective judgment literature. (Lynch, 1996) An exploratory study of student community

service volunteers found that the more experienced students showed a similar pattern in their approach to problem solving in the social science research. They tended to be more elaborate and coherent in their representation of the community problem and to spend more time on problem analysis before exploring solutions. Their solutions were also more likely to be complex and involve several related subproblems. (Eyler, Root and Giles, 1997)

Viable solutions to real problems that include a range of uncertainties result from the use of an increasingly complex set of cognitive skills evidence in a problem solving process that has several identifiable phases: identifying, framing, resolving, and re-addressing unstructured social problems. (Lynch, 1996) **Identifying the nature of the problem** involves distinguishing between highly structured problems or subproblems, for which there is commonly agreed upon correct answers and unstructured problems that are fraught with uncertainties ranging from the definition of the problem to the range and impact of various solutions. Failure to properly identify the nature of a problem i.e. mistaking an unstructured problem for a structured one, may cause one to inadequately explore the problem, which in turn can cause significant difficulties in articulating and justifying a solution. Inexperienced problem solvers often focus on tangential aspects of the problem, especially those that might be considered more well structured, to the exclusion of the larger more difficult unstructured issues. They also tend to slight this part of the process and move directly to the solution phase as noted in the expert novice literature skipping the framing process altogether.

Framing an unstructured problem means exploring the problem and related information as thoroughly as resources permit. Inadequate framing skills can lead students to oversimplified constructions of complex social problems resulting in lack of attention to a) multiple perspectives, b) alternative interpretations of the full range of relevant information and minimizing the effects of unfounded biases.

Resolving an unstructured problem means identifying, articulating and strongly justifying a solution as most viable. After framing the problem, one can think more clearly

about possible solutions. Many people find it somewhat difficult to complete tasks that require strong justifications for their own opinions and effective counter arguments for other options. Only through adequately exploring the problem and judging among competing options as objectively as possible can we hope to put forth the best possible solution with the available information.

Re-addressing or -re-solving an unstructured problem. Once one has recognized the unstructured nature of a community problem and expended effort in framing, articulating and justifying a particular resolution as most viable, it is important to recognize the limitations of that resolution. In many cases, citizens must devise strategies for gathering new information and evaluating the results of previous solutions. (Golub, 1997; Schon, 1983) When important new information is obtained, a reconsideration of the problem is needed. As the process is repeated over time, solutions are likely to become more adequate. Figures 1,2, and 3 come from Lynch and Wolcott's application of reflective judgment theory to the task of professional problem solving; the same process and the same types of challenges to students articulated in Figure 3 are equally applicable to students tackling ill-structured social problems in their service-learning classes. (Lynch and Wolcott, 1997)

The reflective judgment model describes seven qualitatively different sets of assumptions about knowledge. Tables 1 and 2 drawn from Kitchener and King (1985) summarize the key assumptions in levels 3 through 7. The types of reasoning described in levels 1 and 2 are rarely found among college students. The increasing cognitive complexity associated with each stage builds on the previous one and builds a foundation for the next with appropriate challenge and support. Students move from a tendency to view matters in simple black and white terms, through assuming that truth is relative and a matter of personal experience or opinion to a complex process for weighing competing perspectives and integrating information from varied sources.

Community experience, where students face the complexities of social problems and are sometimes confronted with perspectives as well as experiences that are new to them, provide material for challenging reflection in the classroom. In a highly reflective service-learning class, students should be challenged to understand that the problem is ill-structured, to clearly frame it, and to seek out and evaluate a variety of resources and perspectives as they seek to resolve it. Such experiences will encourage students to sharpen their problem solving skills and refine their assumptions to become more adequate for dealing with complex problems. Service experience without this continuous intellectual challenge may have a less visible impact on how students think about problems. This study is an exploratory effort to test the plausibility of this notion.

Methods of the Study.

Sample. Sixty six students who were enrolled in courses with community service components were interviewed at the beginning and end of the spring semester of 1996. These courses were located at six colleges and universities and included both private and large public institutions; included were: University of Colorado, Indiana University- Purdue University at Indianapolis, Michigan State University, California State College at Monterey Bay, Nazareth College and Vanderbilt University. In two courses where service was an option rather than a requirement of the course, a sample of students who did not select the service option were interviewed as a control group. There were 16 students in this control group.

Instrument. The interview protocol included general questions about community service and a series of questions patterned on the classic Reflective Judgment Interview (King and Kitchener, 1994) but designed to address community problems. The problem focus for each reflective judgment interview was a social problem related to the students'

particular service that semester. The interviews lasted approximately 50 minutes and the same interviewer conducted the pre and post interview for each student.

Coding Interview Data Interviews were transcribed and scored by a coder trained in the reflective judgment coding method. While it was not possible to disguise whether interviews were pre or post because of internal cues, the coder was not aware if particular transcripts represented students from the control group or the highly reflective or less intense service-learning experiences. Transcripts were 'shuffled' and interviews from particular times and schools were not coded sequentially. An expert coder who trains RJ coders scored a subsample to check for reliability. The coders had an agreement of .8 and discrepancies were resolved through conferencing.

Data Analysis. Data were analyzed using hierarchical multiple regression with controls for age, gender, previous community service, and previous service-learning. The first analysis examined the impact of these background characteristics on the pre-test measure of reflective judgment. The second analysis examined the impact of participation in service. The third analysis used only the 50 students who participated in service and examined the effects of an intensive reflective service-learning experience compared to participation in a less intensive experience. Intensive classes were those where the service was required and central to the daily class discourse; these classes focused on analyzing the service experience and relating it to the subject matter. Less intensive classes made service an option or were less likely to focus class activities on analysis of the experience.

Findings

Predicting Pre Test Reflective Judgment Scores. The average pretest RJ score for all students was 4.08 which is slightly higher but consistent with scores for college

students reported in the literature. (King & Kitchener, 1994) As might be expected with a developmental construct, the best predictor of reflective judgment before the service semester was the students' ages. In fact age was the only predictor of pretest RJ with a beta of .45. Gender, previous service-learning and previous service were all not significant pre test predictors of RJ.

Impact of Service on Reflective Judgment Scores. In the combined sample of control and service-learning students, service was not a predictor of growth in RJ over the course of the semester. Most students, whether service-learning students or controls, were stable in their RJ scores over this period of time.

Impact of Highly Reflective Service-Learning on Growth in Reflective Judgment. While most students did not show growth in their RJ scores over the relatively brief course of a semester, about 20 % of those participating in service-learning did. For the control group the mean pre test and post test scores were 3.96 and 3.94 respectively. When we compared the impact of moderately and highly integrated service-learning experiences the results were somewhat different. While the students in the moderately intense service experience averaged 4.07 before and 4.08 after their service semester, students in the intensive service-learning classes showed more growth. The RJ average before service was 4.16 and after service was 4.41. In the regression analysis, high integration of the service and learning was a significant predictor of growth with a beta of .23. Interestingly, previous service-learning classes were also a significant predictor of growth with a beta of .20 suggesting that the effects of service-learning may be cumulative; this earlier experience was not a predictor of RJ1 at the pre test.

Conclusions

This study provides some modest support for the view that highly reflective service-learning experiences have an impact on students' ability to deal with complex unstructured problems. It suggests that if development of problem solving skill is a goal of the curriculum that participation in community service may not be enough; students also

need to be challenged to think about the implications of what they are experiencing and to apply subject matter learning to the field and vice versa. Service needs to be tightly linked to learning and reflection is that link.

If instructors are to design courses to enhance the ability of students to deal with unstructured problems, then it will be helpful for them to understand the types of questions and challenges that students at various developmental stages will find useful. The questions in Figure 3 suggest some guides to reflection on understanding these complex issues. And further research to explore the impact of building this focused reflection into the course will be helpful. This study was exploratory and used courses of varying degrees of reflective intensity as they occurred in the field. Further research would profitably focus on experimenting with contrasting approaches to reflection including those more tightly tied to problem solving skills embedded in the reflective judgment model such as the sequence suggested in Figures 2 and 3.

It is also helpful to faculty to be able to monitor student growth and to arrive at a rough assessment of where students are. The interview process is useful for conducting research, but much too cumbersome to use as an assessment tool in the classroom. Wolcott and Lynch (1997) experimented with using a written reflective judgment essay in their work with an accounting class. Students were presented with a challenging accountancy problem and asked to discuss both what they would do and how they arrived at their conclusions. There responses were assessed according to the assumptions and arguments identified in Tables 1 and 2. This essay could then serve as a baseline and be repeated later in the semester; since it is focused on the course subject matter it is simply part of the assignment structure of the course. We are currently piloting a similar essay assignment in a service-learning class related to public policy. Such an assignment helps the instructor identify issues and questions to pursue during class discussion and also helps create an expectation on the part of students that they will concern themselves with both the substance and process of their decisions about unstructured social problems.

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TABLE 1

Assumptions About Knowledge Related to Levels 3 Through 7 of the Reflective Judgment Model

Level	How certain is knowledge?	How is knowledge gained?	How are beliefs justified?
3	Absolutely certain about some things; temporarily uncertain about others.	Via authorities in some areas; through one's own feelings and biases when knowledge is uncertain.	Via authorities in some areas; via what feels right at the moment where knowledge is uncertain.
4	Not certain because of situational variables (e.g., data lost over time).	Via one's own and others' biases, data, and logic.	Via idiosyncratic evaluations of evidence and unevaluated beliefs.
5	Not certain except via personal perspectives within a specific context.	Via evidence and rules of inquiry appropriate for the context. It is relative.	Via rules of inquiry for a particular context.
6	Some personal certainty about beliefs based on evaluations of evidence across different perspectives on an issue.	Via personal assessment of arguments and data and evaluated opinions of experts.	Via generalized rules of inquiry, evaluated views of experts, and personal evaluations that apply across contexts.
7	Certainty that some knowledge claims are better or more complete than others, although claims may need to be re-evaluated when new information becomes available.	Via complex process of critical inquiry or synthesis.	As more or less reasonable conjectures about the problem based on an integration and evaluation of relevant data, evidence, and/or opinion.

Source: Kitchener (1986, 78-79).

TABLE 2

Approaches to Unstructured Problems Based on Levels 3 Through 7 of the Reflective Judgment Model

Level	Recognizing the Nature of a Problem	Framing an Unstructured Problem	Resolving an Unstructured Problem
3	• All problems perceived as well structured • Looking for the right answer	• Attempts rather mechanical • Unable to frame in light of uncertainties • May respond with expressions of confusion or futility	• Unable to reason logically from evidence to conclusions • Tendency to fall back onto whim or prior beliefs • Opinions classified as correct or incorrect, or equally valid if uncertainty is acknowledged
4	• Distinguishes between well structured and unstructured problems • Likely to attribute uncertainties to a limited range of reasons	• Respond to problem rather holistically; limited ability to break it down or place it in its larger context • Can identify evidence and various perspectives, but ability to logically organize this information is limited	• May appear reluctant to examine own views objectively • Attempts at examining evidence and competing views may reflect quantitative rather than qualitative approaches • Often argues that solutions are equally valid
5	• Understands the relative nature of unstructured problems when viewed from different perspectives	• Significant efforts to articulate a detached, balanced view of the problem from different perspectives or contexts	• Uses evidence to reason logically within a given perspective • Justifies beliefs by rules of inquiry for a particular context • May seem reluctant about articulating and defending a solution as most viable
6	• Understands that unstructured problems require coming to personal conclusions, based on evaluations across perspectives	• Frames problems so that more generalized principles, concepts or goals subsume different perspectives	• Able to make well-founded judgments about which solutions are more viable than others • Likely to base opinions on evaluated beliefs of experts or the pragmatics of situation
7	• Understands that new and better knowledge can be constructed through synthesis of existing views and evidence • On-going, cumulative nature of knowledge may be articulated	• Addresses large, unstructured problems with complex, flexible frameworks that can provide new insight • Breaks issues into parts that can be addressed in appropriate ways while maintaining rational view of greater problem context	• Systematically uses processes of critical inquiry to work through complex, unstructured problems • Argues convincingly using complex, coherent discussion of own perspective, including strengths and limitations

Source: Kitchener and King (1985).

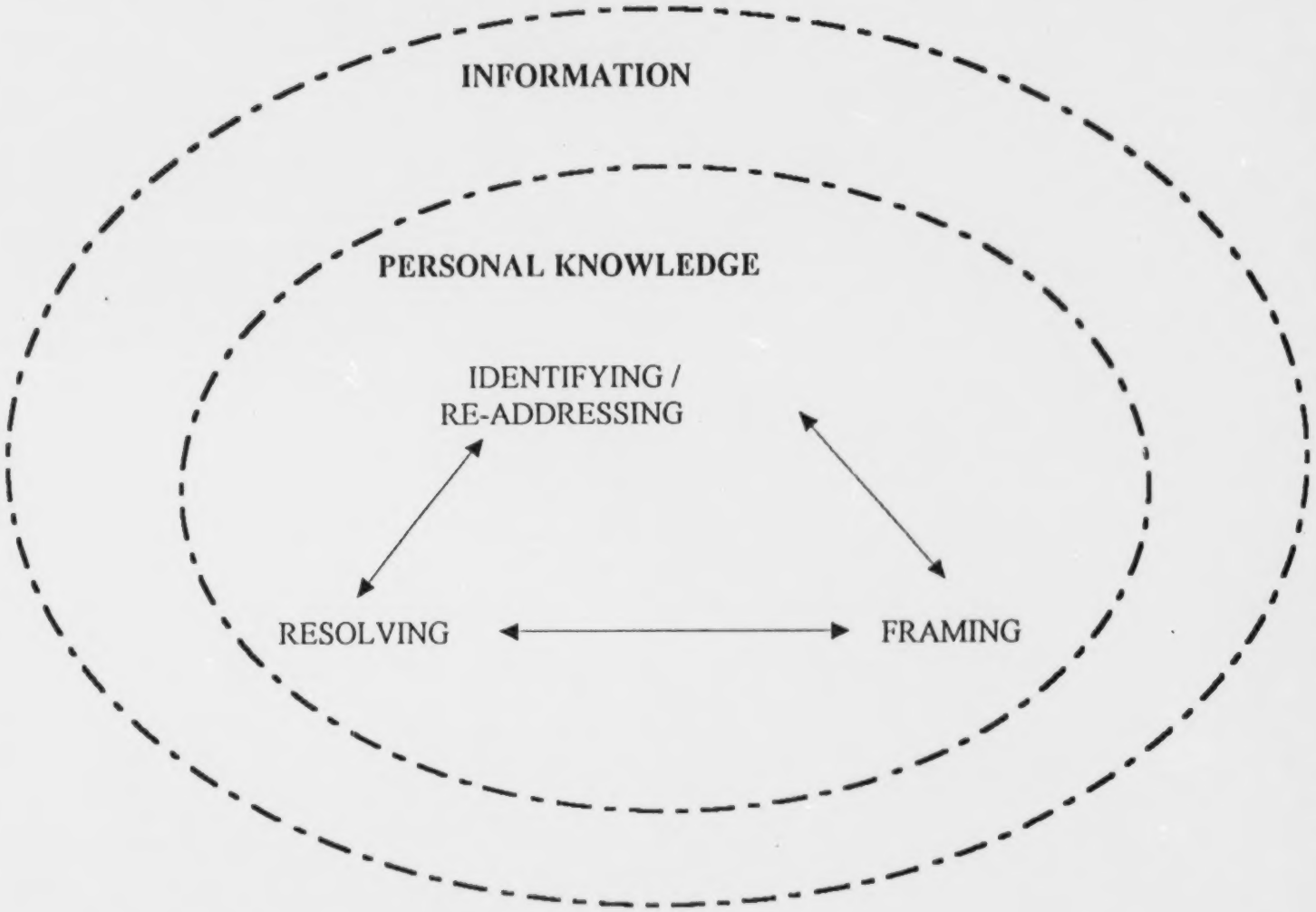

Figure 1. A Process for Problem Solving

Source: Lynch and Wolcott, 1997 "Optimizing Professional Problem Solving"

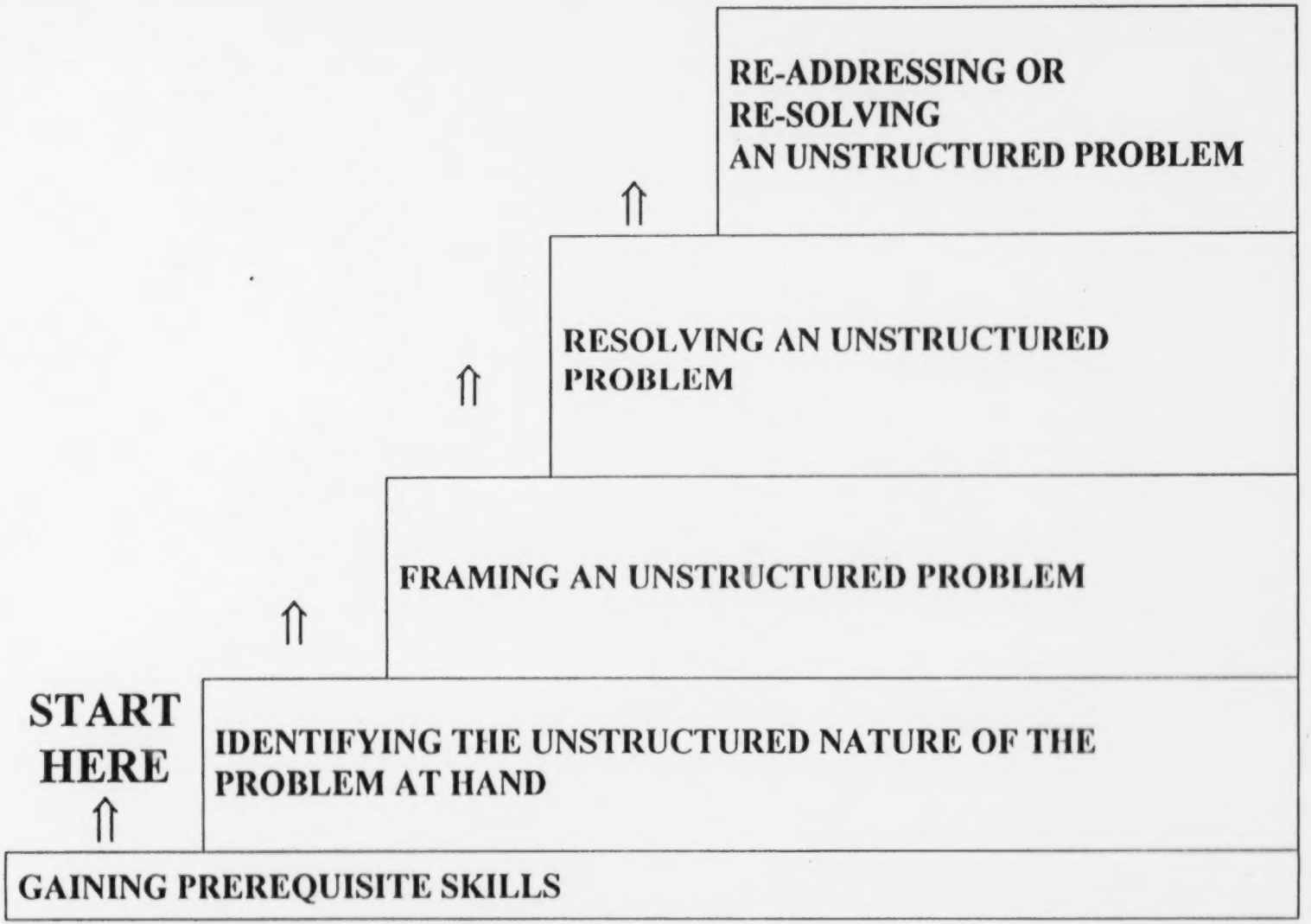

Figure 2. A Simplified View of a Process for Problem Solving During Service-Learning

Source: Lynch and Wolcott, 1997 "Optimizing Professional Problem Solving"

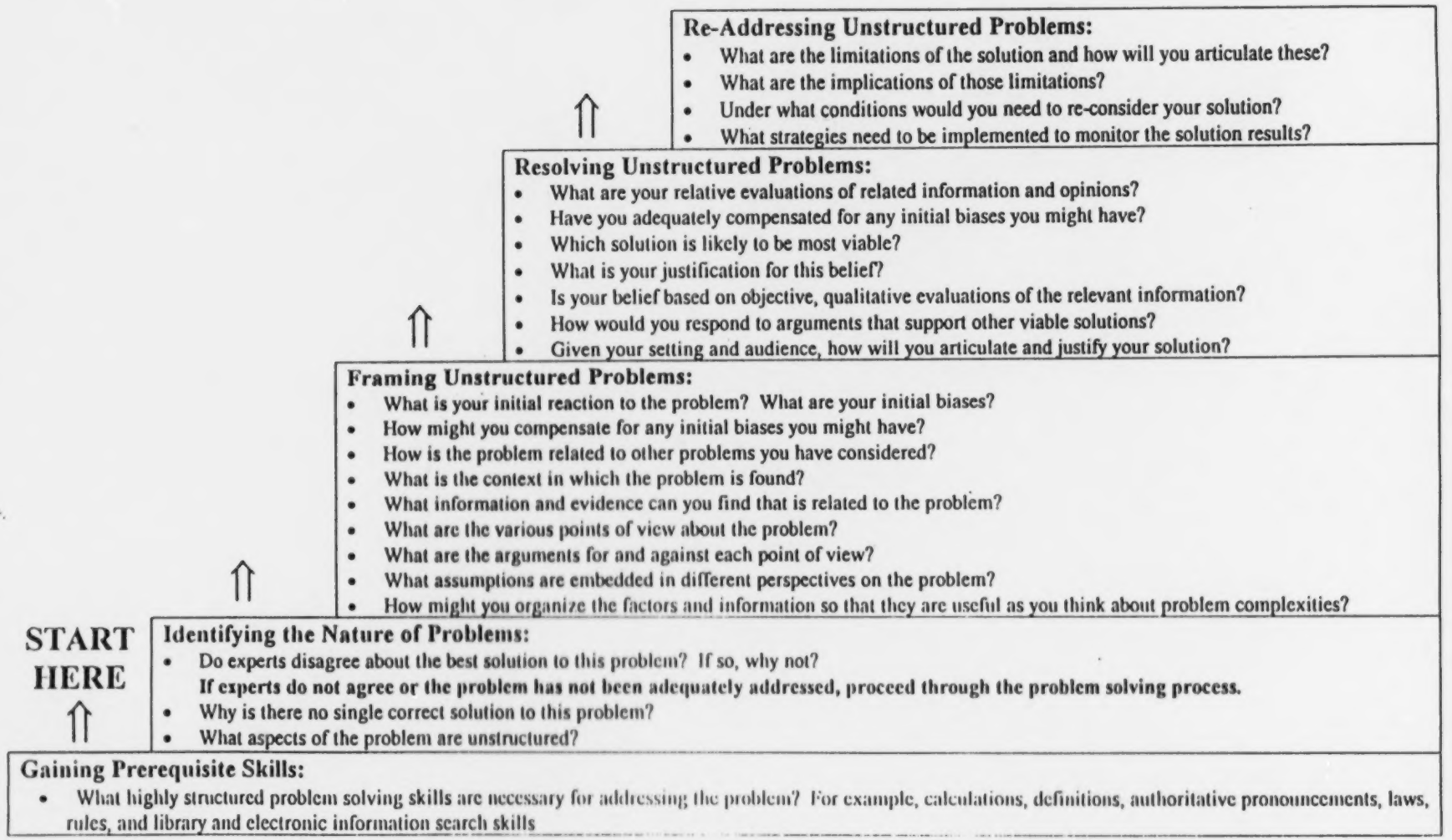
Re-Addressing Unstructured Problems:
• What are the limitations of the solution and how will you articulate these?
• What are the implications of those limitations?
• Under what conditions would you need to re-consider your solution?
• What strategies need to be implemented to monitor the solution results?
Resolving Unstructured Problems:
• What are your relative evaluations of related information and opinions?
• Have you adequately compensated for any initial biases you might have?
• Which solution is likely to be most viable?
• What is your justification for this belief?
• Is your belief based on objective, qualitative evaluations of the relevant information?
• How would you respond to arguments that support other viable solutions?
• Given your setting and audience, how will you articulate and justify your solution?
Framing Unstructured Problems:
• What is your initial reaction to the problem? What are your initial biases?
• How might you compensate for any initial biases you might have?
• How is the problem related to other problems you have considered?
• What is the context in which the problem is found?
• What information and evidence can you find that is related to the problem?
• What are the various points of view about the problem?
• What are the arguments for and against each point of view?
• What assumptions are embedded in different perspectives on the problem?
• How might you organize the factors and information so that they are useful as you think about problem complexities?
START HERE
Identifying the Nature of Problems:
• Do experts disagree about the best solution to this problem? If so, why not?
If experts do not agree or the problem has not been adequately addressed, proceed through the problem solving process.
• Why is there no single correct solution to this problem?
• What aspects of the problem are unstructured?
Gaining Prerequisite Skills:
• What highly structured problem solving skills are necessary for addressing the problem? For example, calculations, definitions, authoritative pronouncements, laws, rules, and library and electronic information search skills

Figure 3. A Series of Basic Questions to Structure Service-Learning Reflection

Source: Lynch and Wolcott, 1997 "Optimizing Professional Problem Solving"